



1/10

BEST AVAILABLE COPY

FIG 1 Peter and the wolf: Score

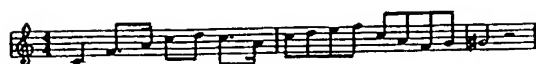


FIG 2 Peter and the wolf: Sound wave

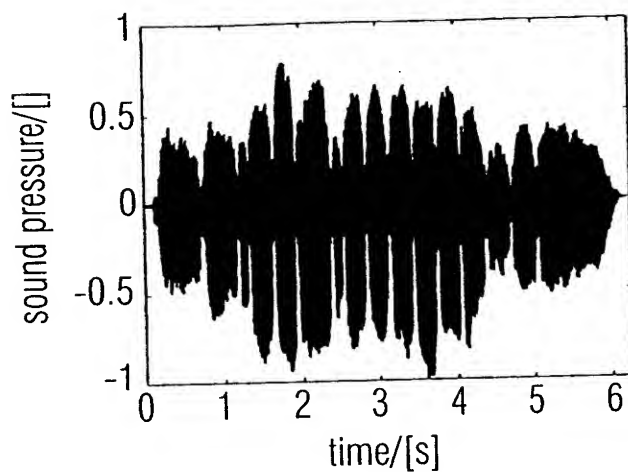
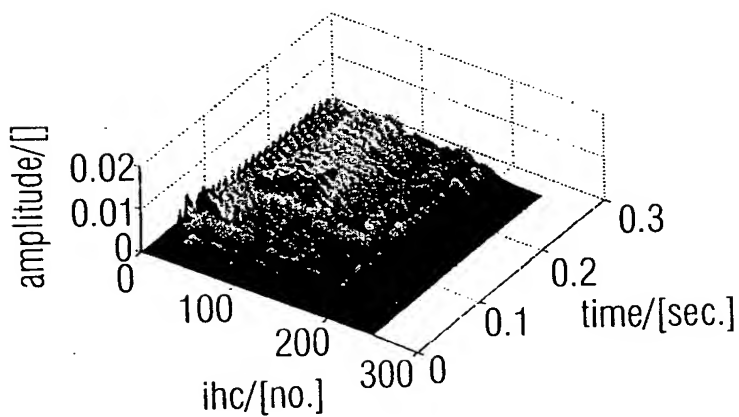


FIG 3 IHC cleft contents



2/10

FIG 4. Cleft content of IHC #12

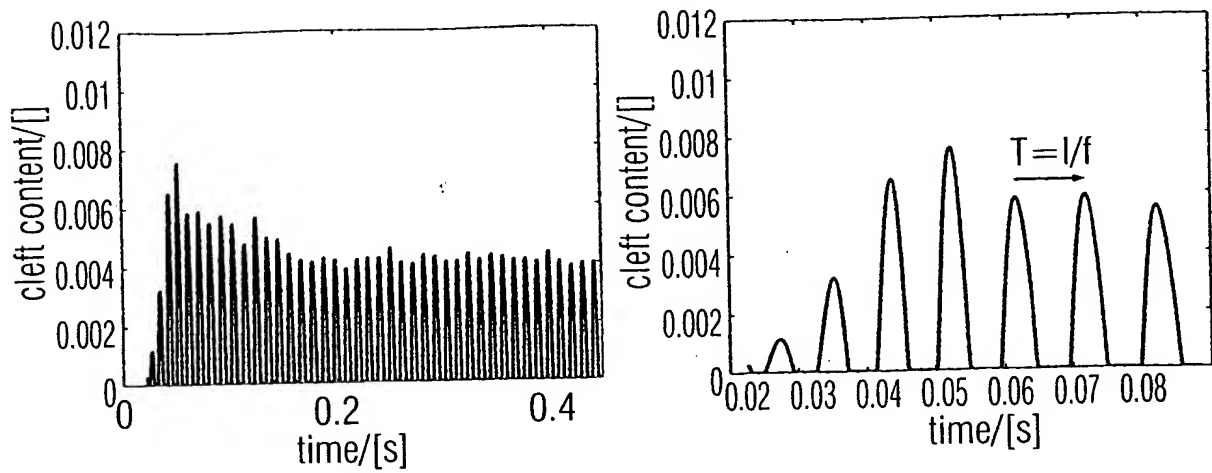


FIG 5. Cleft content of IHC #12

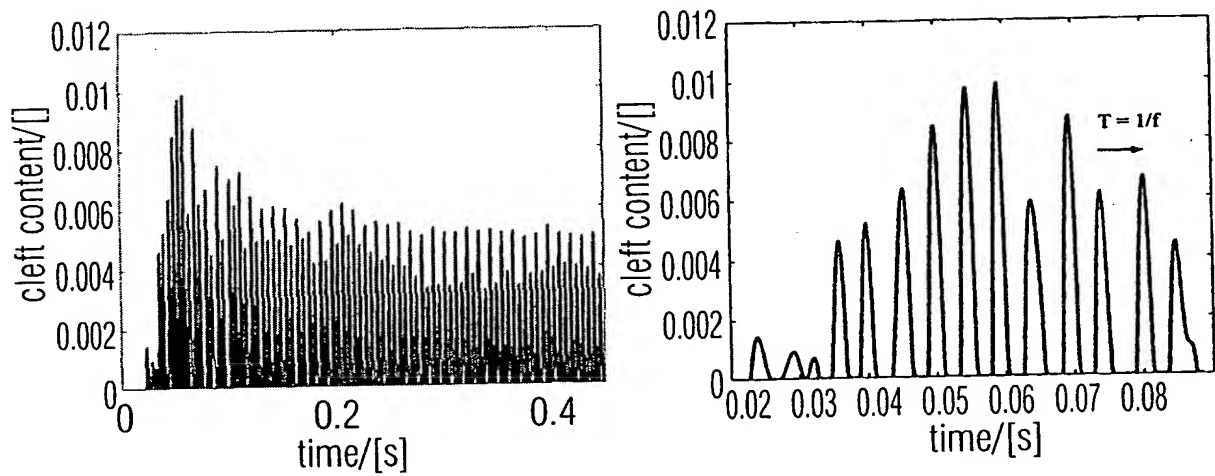


FIG 6. SACF histogram

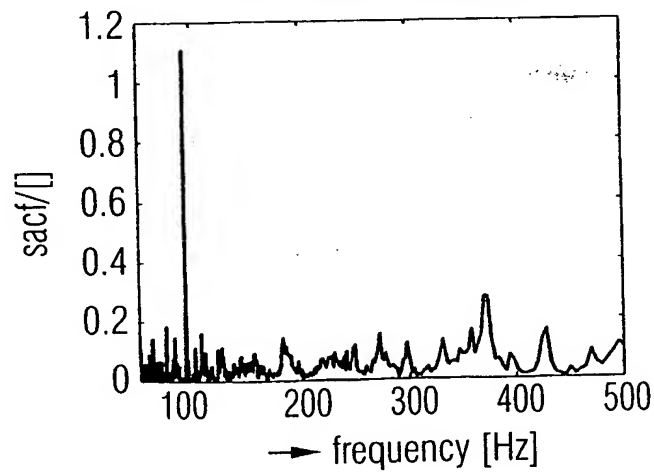


FIG 7: Initial pitch estimation vs. cleaned pitch trajectories

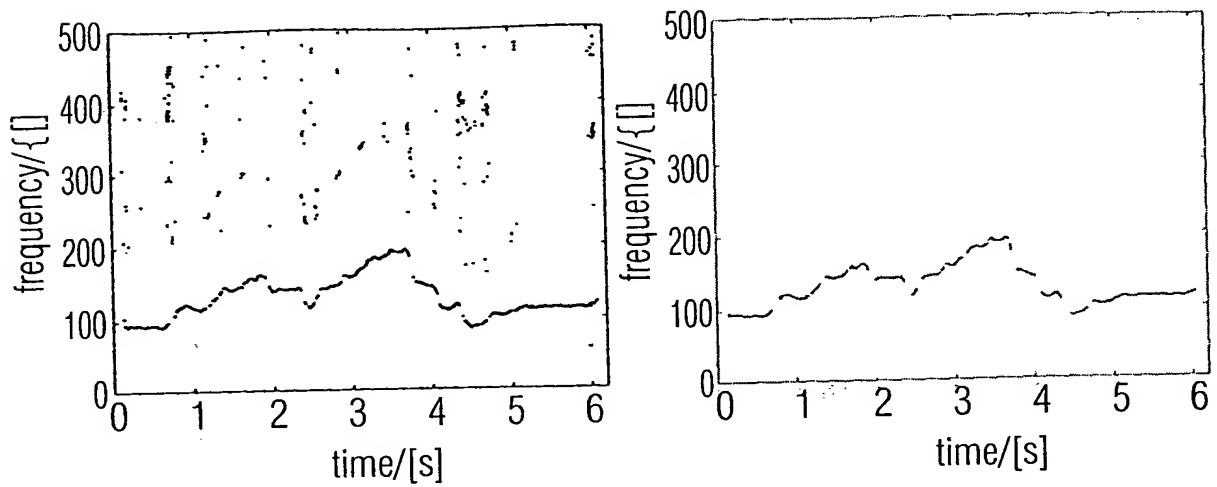


FIG 8: Envelopes of transmitter substance: 1st and 4th partial

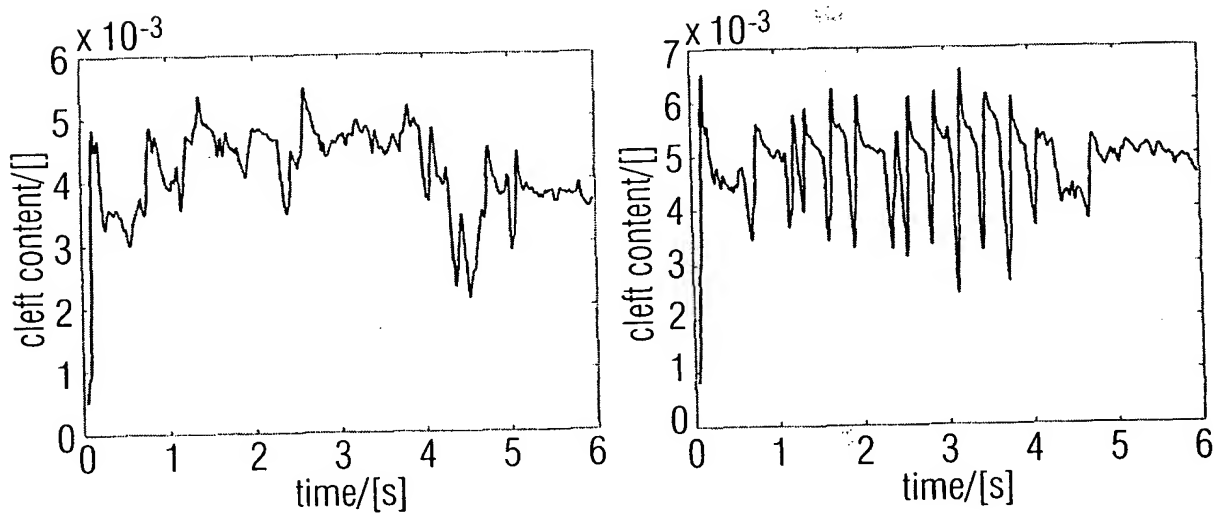


FIG 9: Onset map

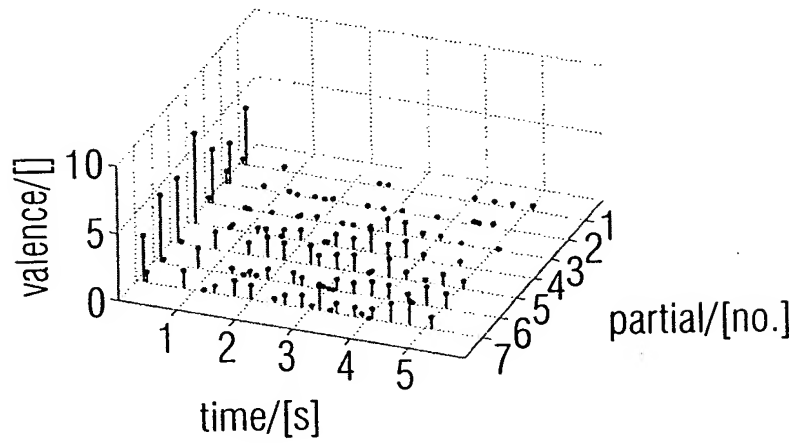
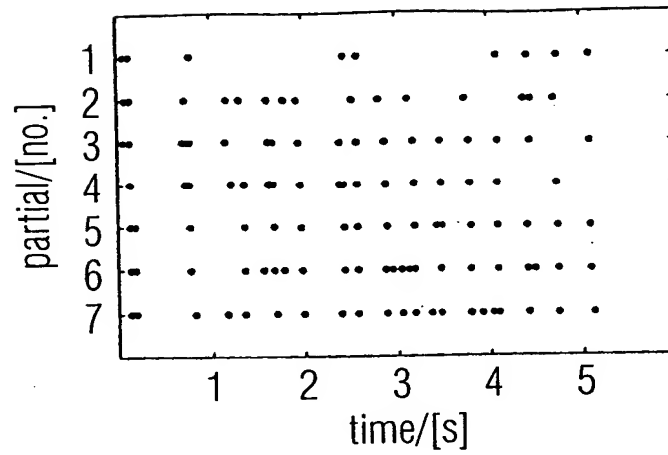


FIG 10: Onset masking

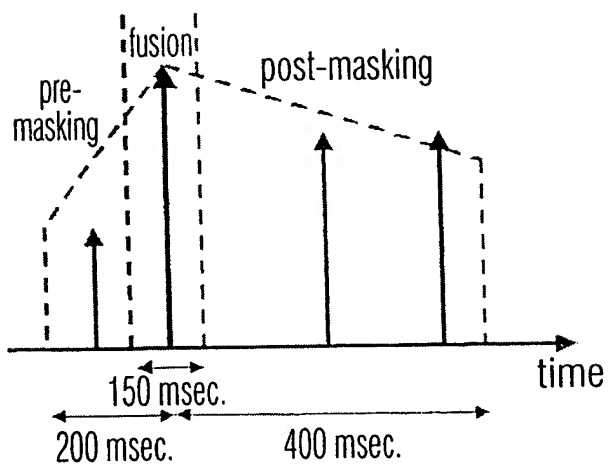


FIG 11: Onset histogram

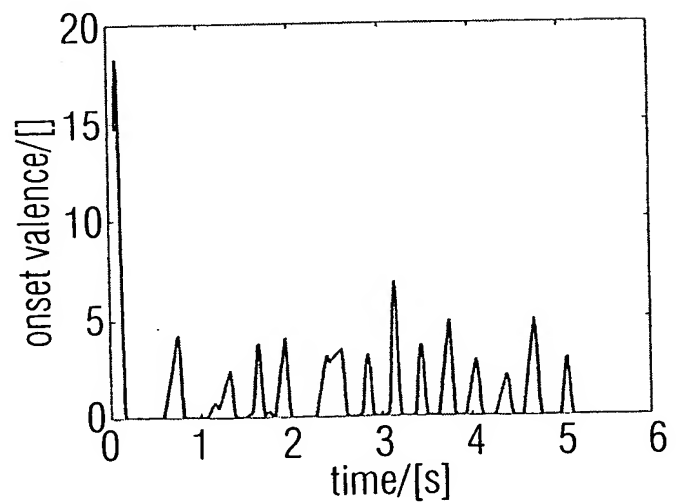


FIG 12: Pitch trajectories, segmented

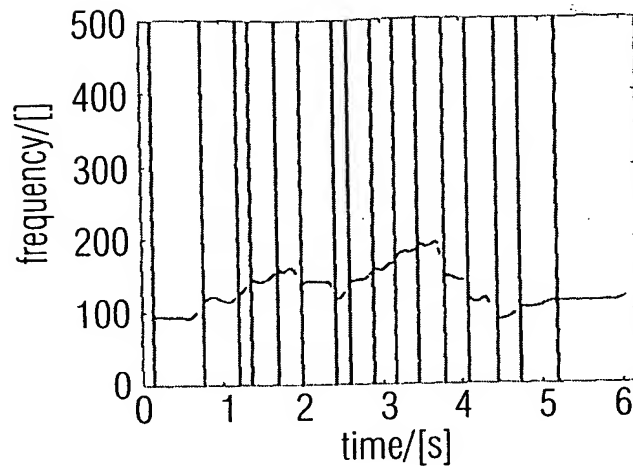


FIG 13: Feature values, clarinet Bb3

partial [no.]	onset time [s]	frequency [Hz]	amplitude []	IHC peak [no.]	IHC resonance [no.]
1	0.187	236.4	0.00878	27	30
2	0.218	467.8	0.00555	48	14
3	0.192	703.5	0.00862	73	36
4	0.219	878.2	0.00735	94	2
5	0.201	1170.6	0.00733	102	12
6	0.202	1405.3	0.00776	113	12
7	0.206	1640.8	0.00783	123	16

FIG 14: Query-By-Humming: 1152 query inputs

		EarAnalyzer	Extreme	Hough
database 1 (200 pieces)	Position 1	82.8 %	59.5 %	39.9 %
	Top 10	92.5 %	75.1 %	56.9 %
database 2 (1024 pieces)	Position 1	78.5 %	53.5 %	32.0 %
	Top 10	88.9 %	67.9 %	42.9 %

FIG 15: Query-By-Humming incl. GSM distortion: 1152 query inputs

		EarAnalyzer	Extreme	Hough
Fullrate	Position 1	79.3 %	49.4 %	42.0 %
	Top 10	88.9 %	67.1 %	56.3 %
Enhanced Fullrate	Position 1	80.6 %	60.4 %	45.0 %
	Top 10	91.2 %	73.9 %	62.7 %
Half-rate	Position 1	69.9 %	48.4 %	30.2 %
	Top 10	82.5 %	65.4 %	49.0 %
Original	Position 1	82.8 %	59.5 %	39.9 %
	Top 10	92.5 %	75.1 %	56.9 %

FIG 16: Instrument recognition rates [total (clarinet|oboe|bassoon)]

training vs. query	McGill [%]	Gdansk [%]	Fraunhofer [%]
McGill	100 (100 100 100)	80 (94 47 94)	88 (97 67 97)
Gdansk	85 (75 87 94)	100 (100 100 100)	87 (86 73 100)
Fraunhofer	81 (58 93 94)	72 (64 60 94)	100 (100 100 100)
McGill + Gdansk	99 (97 100 100)	100 (100 100 100)	91 (92 83 97)
McGill + Fraunhofer	100 (100 100 100)	83 (92 53 100)	100 (100 100 100)
Gdansk + Fraunhofer	88 (78 93 94)	100 (100 100 100)	100 (100 100 100)

FIG 17: extended analog model by Baumgarte

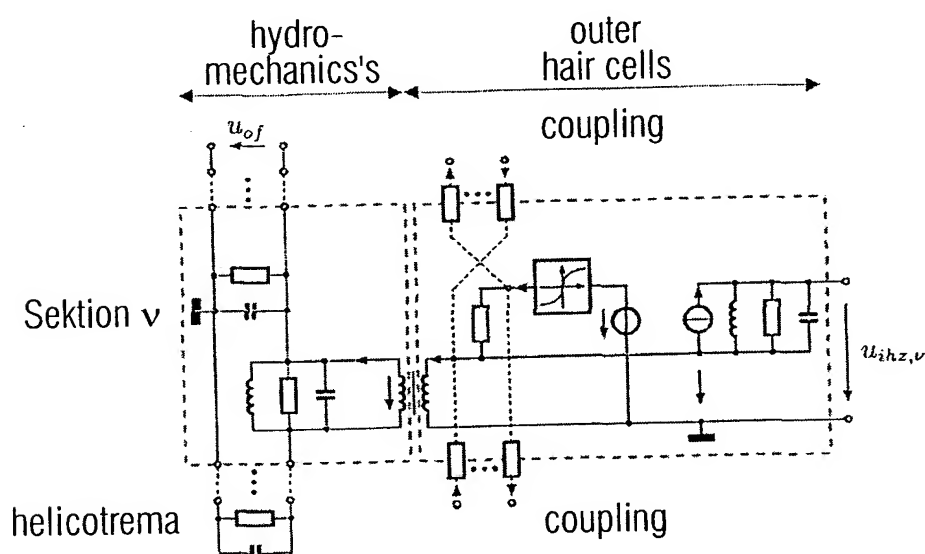
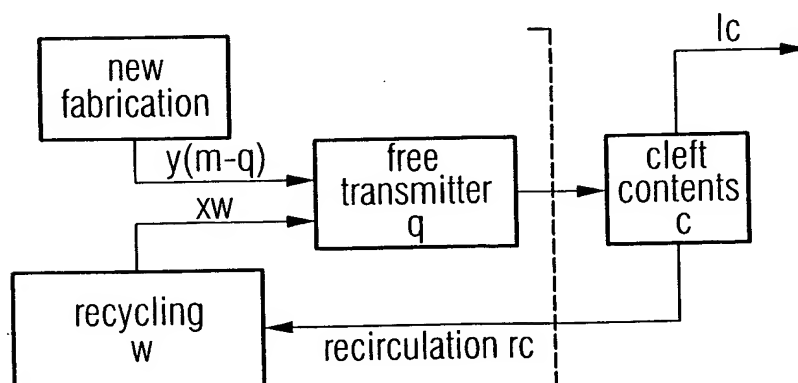


FIG 18: hair cell model by Meddis



7/10

FIG 19: mathematical description of the model in Fig 18

$$k = \begin{cases} gdt \cdot \left(\frac{s+A}{s+A+B} \right) & : s + A \geq 0 \\ 0 & : s + A < 0. \end{cases}$$

$$\frac{dq}{dt} = y(m - q) + xw - kq,$$

$$\frac{dc}{dt} = kq - lc - rc,$$

$$\frac{dw}{dt} = rc - xw.$$

A	=	10
B	=	3000
x	=	66.31
g	=	1000
y	=	5.05
m	=	1
l	=	2500
r	=	6580

FIG 20: crosssection of the cochlea

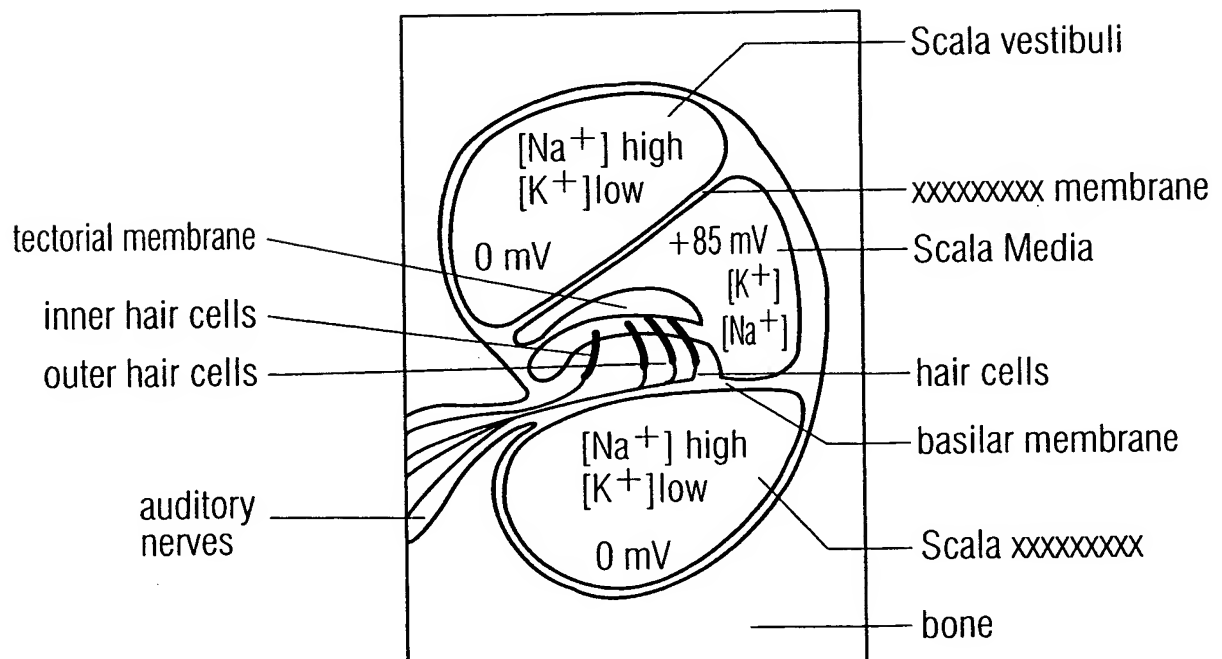


FIG 21

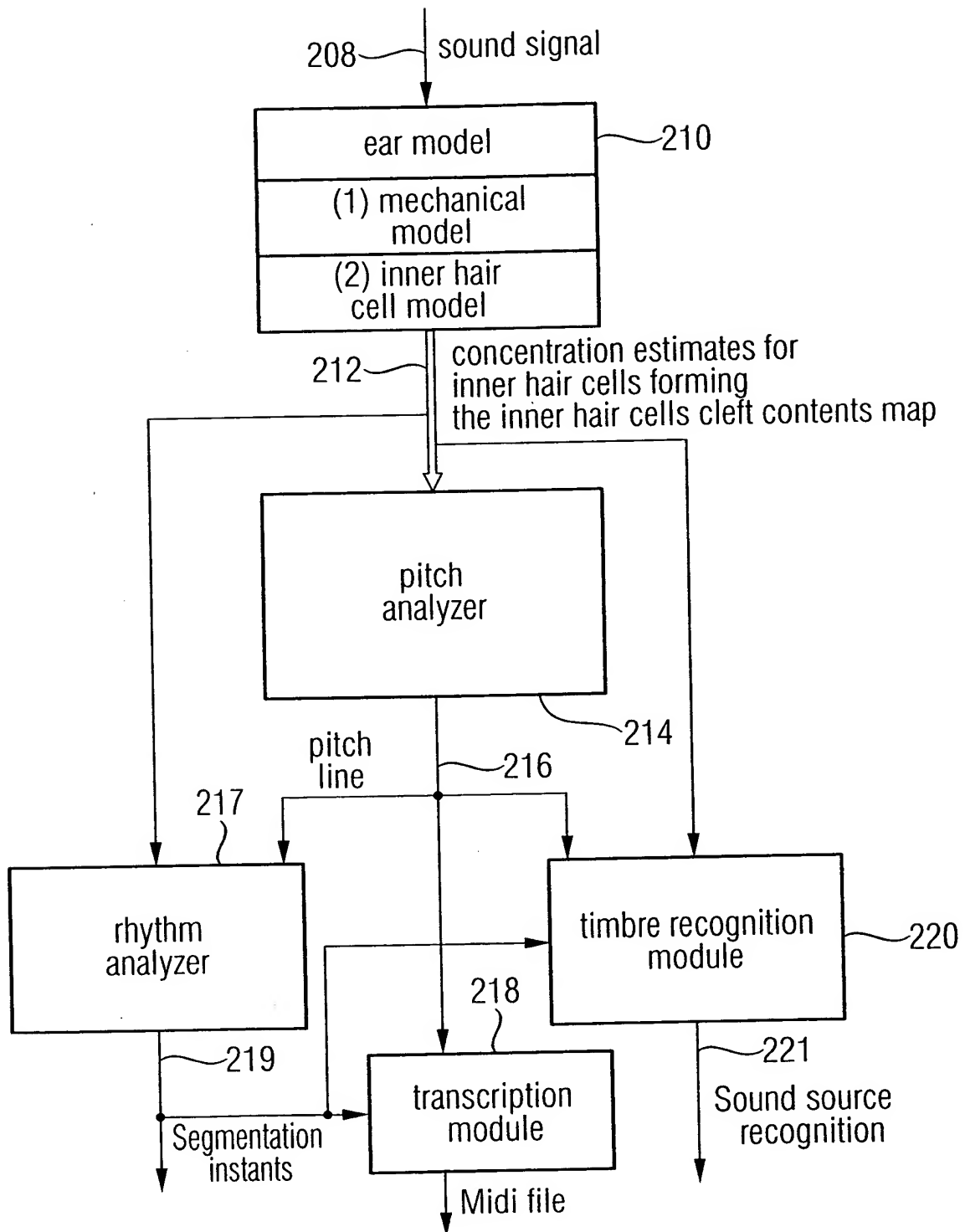


FIG 22 (pitch analyzer)

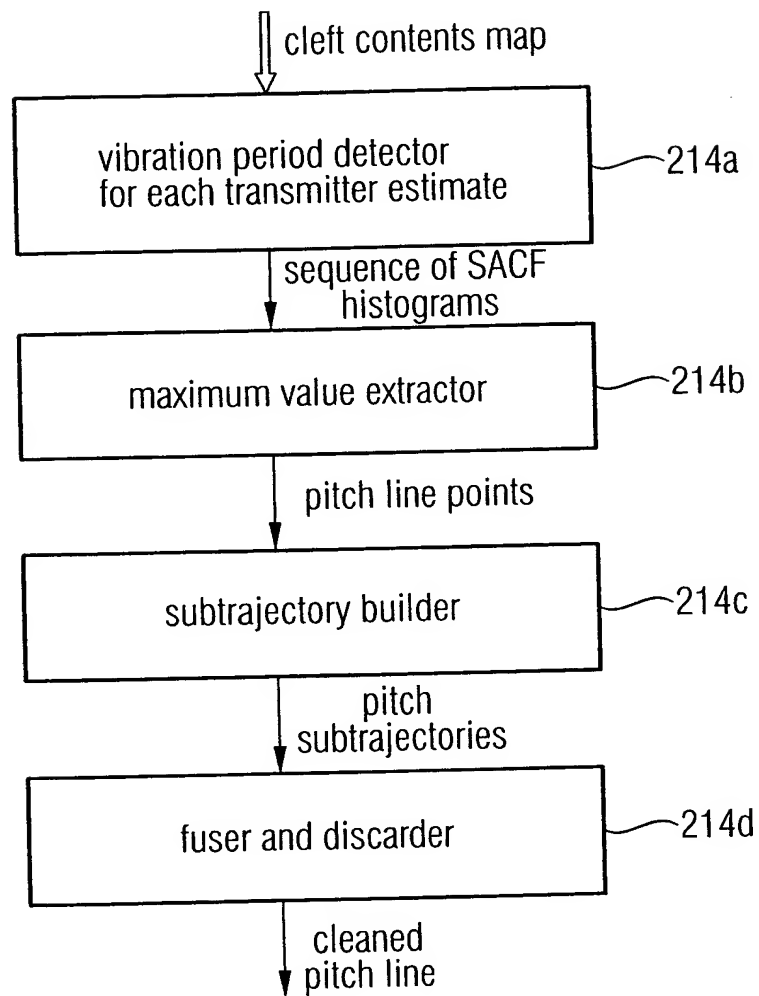


FIG 23 (rhythm analyzer)

